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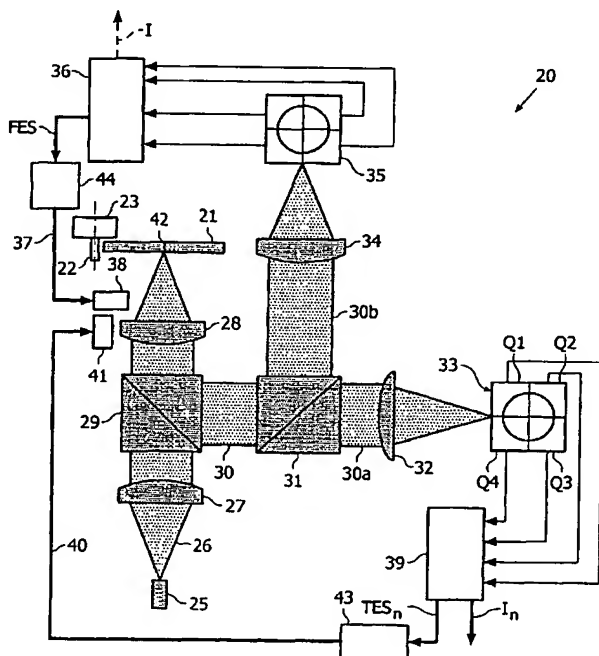
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR WRITING OPTICALLY READABLE DATA ONTO AN OPTICAL DATA.



(57) Abstract: The invention relates to an apparatus (20) for reading data from and/or writing data onto an optical data carrier (21) is proposed. An optical source generates an incident beam (26), an objective lens assembly (28) focuses the incident beam onto the optical data carrier. A thin convex lens (32) without substantial astigmatism is used for projecting the returning beam (30) onto an optical detection assembly (33) for generating a tracking error signal. An optical data carrier has a recording layer, onto which optically readable data is written in the form of binary marks or pits (11). The binary marks are capable of causing a phase difference which lies close to 180° between reflected light which has interacted with said binary marks and reflected light which has interacted with the rest of the recording layer. The signal to noise ratio of data signal and tracking error signal are improved at the same time.

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 39 31 500 A1 (HITACHI, LTD., TOKIO/TOKYO, JP) 22 March 1990 (1990-03-22)	1-4
Y	column 7, line 44 - column 11, line 34; figures 1,5A-6B	5
X	EP 0 135 750 A (HITACHI, LTD) 3 April 1985 (1985-04-03)	1-4
Y	page 12, line 15 - page 13, line 3; figure 1	5
Y	EP 1 111 599 A (SHARP KABUSHIKI KAISHA) 27 June 2001 (2001-06-27) paragraphs '0009! - '0020!, '0033!, '0069! - '0084!; figures 3-5,8,9	5
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 111 006 A (SONY CORPORATION) 20 June 1984 (1984-06-20) page 4, line 2 - page 6, line 13; figures 1-3 -----	5
X	EP 0 360 466 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) 28 March 1990 (1990-03-28) column 1, line 54 - column 9, line 56; claims 5,11,15; example 1 -----	6-10
X	EP 0 737 967 A (TORAY INDUSTRIES, INC) 16 October 1996 (1996-10-16) page 4, lines 43-47; claims 5,21 -----	6,7,9,10

INTERNATIONAL SEARCH REPORT

Inter Application No
PCT/IB2004/003356

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3931500	A1	22-03-1990	US 5396477 A 07-03-1995 US 5511050 A 23-04-1996 JP 2168435 A 28-06-1990
EP 0135750	A	03-04-1985	JP 2118368 C 06-12-1996 JP 8007873 B 29-01-1996 JP 60047242 A 14-03-1985 JP 60047243 A 14-03-1985 DE 3472322 D1 28-07-1988 EP 0135750 A2 03-04-1985 US 4656618 A 07-04-1987
EP 1111599	A	27-06-2001	JP 3600105 B2 08-12-2004 JP 2001243661 A 07-09-2001 EP 1111599 A2 27-06-2001 US 6438098 B1 20-08-2002
EP 0111006	A	20-06-1984	JP 58208944 A 05-12-1983 AT 34242 T 15-05-1988 DE 3376595 D1 16-06-1988 EP 0111006 A1 20-06-1984 WO 8304331 A1 08-12-1983 US 4654838 A 31-03-1987
EP 0360466	A	28-03-1990	JP 2068303 C 10-07-1996 JP 2073537 A 13-03-1990 JP 7105063 B 13-11-1995 JP 2068311 C 10-07-1996 JP 2113451 A 25-04-1990 JP 7105064 B 13-11-1995 DE 68927731 D1 13-03-1997 DE 68927731 T2 31-07-1997 EP 0360466 A1 28-03-1990 US 5249175 A 28-09-1993
EP 0737967	A	16-10-1996	CN 1514436 A 21-07-2004 CN 1142657 A ,C 12-02-1997 EP 1189212 A2 20-03-2002 EP 0737967 A2 16-10-1996 HK 1010418 A1 09-05-2003 JP 9237435 A 09-09-1997 JP 2003132535 A 09-05-2003 US 5863702 A 26-01-1999 US 5888680 A 30-03-1999 JP 9120536 A 06-05-1997 DE 69621977 D1 01-08-2002 DE 69621977 T2 30-01-2003